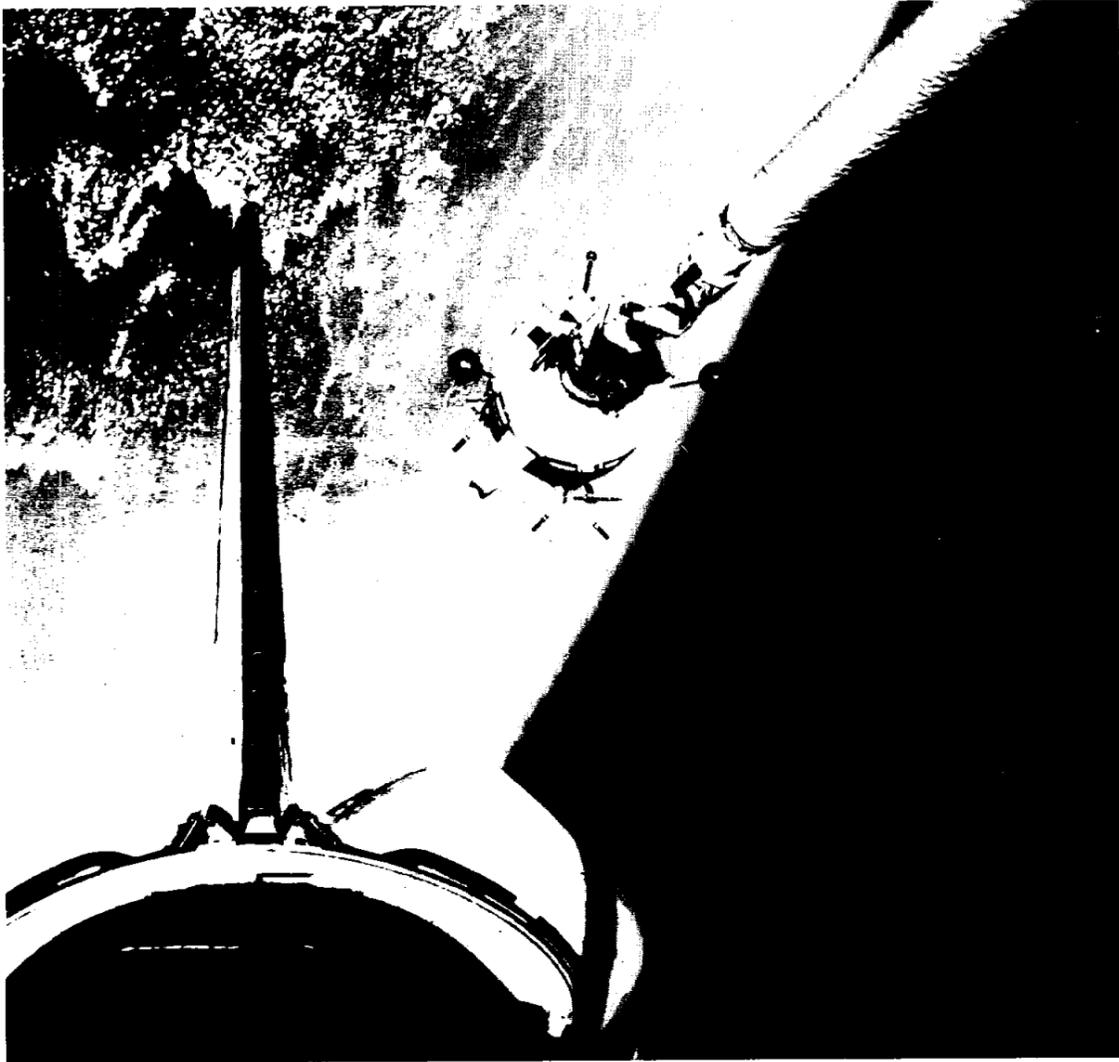


Space News Roundup

'Adventure of a lifetime'

STS-3 crew describes longest Shuttle flight yet



Against the limb of Earth, Columbia and the Shuttle program's first grappled payload, the Plasma Diagnostic Package, are seen at work during the recent STS-3 mission.

In their first public appearance since landing day ceremonies March 30, the STS-3 crew engaged in their most widely disseminated debriefing yet when they went before the press and the public for the post-flight press conference Tuesday.

"We come to you blessed with success and with an intense feeling of gratification," Commander Jack Lousma said before he and Pilot Gordon Fullerton launched into a detailed account of their eight-day mission.

Lousma began his overview of the mission by noting that since December the entire flight team had worked toward a March 22 launch date, "and we held to it," he said, with obvious satisfaction.

Fullerton said the flight was "truly the adventure of a lifetime," and went on to outline some of the mission events from the crew's perspective.

A major consideration early in the flight, he recalled, was the state of their health. "On the first afternoon in orbit, I was in an almost euphoric state. Jack didn't feel quite so chipper, and he had to keep reminding me to quit looking out the windows and get back to the flight plan."

Motion sickness was the culprit, as it has been on a number of manned space flights in the past. Fullerton said the anti-motion sickness pills they took the first day probably led to problems the next day because it nullified any desire they might have had to eat. "Trying to sleep in micro-g was confusing and neither one of us got very much sleep the first night," Fullerton continued, "so the end result of not eating very

much and not getting much sleep was our being very tired on the second day."

That day, March 23, "was probably the low day in our morale," he said, because he and Lousma were tired, and they had three glitches that day which "all combined to lower our morale."

Those glitches were the discovery of missing tiles, the malfunction of the mechanical arm's wrist camera and a payload bay camera, and the payload bay door latching problem that afternoon.

By the third day, however, the crewmen had gotten more rest and had "really put on the feedbag, and we felt great after that," Fullerton said.

The two then presented a photographic essay of the flight, noting that more than 900 still photos, 11 hours of video tape and just about all of the 16 and 70 millimeter film aboard had been used up during the long flight.

During footage of the launch, Fullerton expressed a measurable degree of respect for the power of the solid rocket boosters. "You have no doubt when they have kicked in," he said. "It is a relentless push." Lousma described the launch as a "continuing, compelling acceleration."

But when the boosters separate from the external tank, Fullerton said, "the ride is about as smooth as glass, probably smoother than any airliner."

Once on orbit, they became adapted to the near weightlessness after a day or two. "It was hard for me to figure out what to do with my head when I was trying to sleep," Fullerton said.

(Continued on page 4)

Kraft leaving at end of '82



Dr. Christopher C. Kraft Jr.

JSC Director Christopher C. Kraft Jr. announced today that he will leave the National Aeronautics and Space Administration at the end of this year.

He said he has no definite plans for the future.

Dr. Kraft noted that after the fifth flight of the Space Shuttle, scheduled in November, the Shuttle will have established its operational status. "This will be a transitional period for activities at the Johnson Space Center and a

reasonable time to depart," he said.

Kraft called the outlook bright for NASA and for JSC and said he is confident the nation will continue to recognize the importance and the potential of space exploration and space applications. He said his career with NASA has been personally rewarding.

"It has been a privilege to work with so many excellent and devoted people, both in government and in the aerospace indus-

try," he said. "In my estimation, their work represents the greatest engineering achievement of the twentieth century."

He began his government career in 1945 with the National Advisory Committee for Aeronautics Langley Aeronautical Laboratory. In 1958 he was selected as one of the original members of the Space Task Group, the organization established to manage Project Mercury.

In the early phases of Project Mercury he was a principal contributor to the development of many of the basic mission and flight control techniques used in manned space flight. He served as flight director for all the Mercury missions and for many of the Gemini missions. During the later phase of Project Mercury he directed the design and implementation of the Mission Control Center in Houston from which all succeeding U.S. manned space programs have been conducted.

Kraft was honored by President Carter in 1980 as one of the nation's outstanding career federal employees and was awarded the Presidential Rank of Distinguished Executive. He has 3 times received NASA's highest award, the Distinguished Service Medal. In 1963 he received the Arthur S. Flemming Award as one of 10 outstanding young men in government career service and in 1962 he was selected as one of the 100 outstanding young leaders in the nation by the editors of Life Magazine.

**We extend a genuine, enthusiastic
WELL DONE**

to all hands for a superlative performance on STS-3! Your long hours of preparation really paid off during the flight. No doubt you recall our concern in early January about being ready by launch time. It was gratifying to see the entire team accept the challenge and rise to the occasion. By launch time we sincerely believed everyone had done their level best to ensure a ready team and a solid vehicle.

For us, the mission was the ultimate in high adventure from ignition to wheel stop. Reservations surrounding the ability to accomplish a highly ambitious flight plan faded as each problem and obstacle yielded to your positive response and the integrity of the spacecraft. In the final analysis, it appears STS-3 was the "textbook mission" for which we all were targeting.

Equally rewarding is the observation that Americans have grasped the success of the Columbia as a tangible symbol of national achievement and prestige. You can all be proud of the professional impression you are creating in a vital, highly visible role in America's renewed resolve to assert itself in world leadership.

For the next few months, as you prepare for another successful mission, we will be representing you directly on the public affairs circuit. Be assured that any applause we receive will be accepted on your behalf. It is a privilege for us to be a part of your team. We look forward to assisting where possible to make STS-4 as successful as STS-3.

Jack Lousma

J. R. Lousma

Gordon Fullerton

C. G. Fullerton

Space News Briefs

SRB's stacked, Columbia back in OPF

A mating of the external tank with the twin solid rocket boosters could come today at the Kennedy Space Center as preparations for the next Space Shuttle flight continue. Columbia, now with a few million miles on the airframe, is back in the Orbiter Processing Facility at KSC with its STS-3 payloads unloaded and more than 700 thermal tiles removed for densification. The monomethyl hydrazine fuel in the forward reaction control system was drained late last week, and other hypergolic propellants were to be drained from other attitude control systems by next week. Access platforms have been installed in the cargo bay, and the No. 1 transponder and power amplifier which gave Houston problems on the last flight have been removed for inspection. Stacking of the SRB's was completed before Easter, except for final closeout work in the joints and motor segments which was completed earlier this week. Launch of the fourth and last orbital flight test is still scheduled for late June or early July.

NASA improving Shuttle TPS

Lighter, stronger and more economical second generation materials are now in the pipeline for improvement of the Space Shuttle thermal protection system (TPS). There are primarily two new materials which are being phased into use on *Columbia*, and which will be used to an even greater extent on the orbiters *Challenger*, *Discovery*, and *Atlantis*. Advanced Flexible Reusable Surface Insulation, or AFRSI, is a type of silica glass quilt which was installed on *Columbia* prior to the launch of STS-2. About 20 square feet of AFRSI was installed in the eleven coves of *Columbia*, where temperatures on reentry have reached 1,500° F. This advanced type of surface insulation is tougher, lighter and cheaper than earlier heat shield materials. A square foot of the new insulation cost about \$200, compared to \$1,000 a square foot for the original materials. Also being developed for future orbiters is Fibrous Refractory Composite Insulation, or FRCI-12, installation of which is expected to save about 1,000 pounds on *Discovery* and *Atlantis*. The FRCI-12 comes in 36-inch squares, can be cut to size and glued on, and costs an order of magnitude less than the material it will replace. According to Ames Research Center thermal protection expert Howard Goldstein, FRCI-12 is the first material ever made where silica can be contaminated with certain additives and still remain stable to temperatures of 2,300° F.

Huge stellar ejection detected

Astronomers have detected an extraordinary ejection of material from a relatively nearby star which may one day be directly observable from the Space Telescope when it is launched in 1985. The violent ejection of material, or jet, is occurring in a binary star system known as R Aquarii, and has a length about 20 times the size of our solar system. It is one of only two such structures known in the galaxy. Astronomers at the Goddard Space Flight Center, the University of Maryland and the Lick Observatory at the University of California detected the jet structure in the binary system, which is 750 light years from the Sun. The only other jet structure known in the galaxy is occurring in the star SS 433, which is 20 times farther away. One astronomer estimated the ejected material in the R Aquarii jet may be moving at speeds greater than 1,000 miles per second. Additional observations are planned with NASA's orbiting International Ultraviolet Explorer. Astronomers are also looking to 1985, with the belief that the jet may just be observable with the Space Telescope when it is operational, the first opportunity to directly study such a formation.

People

Carlos D. Pena, a digital design engineer for Lockheed Engineering and Management Services Co., has been selected to receive Lockheed Corporation's highest honor for technical excellence—the Robert E. Gross Award. Pena joined Lockheed at JSC in 1966 and has made substantial design contributions to computer technology used in the Apollo, Skylab and Space Shuttle programs. Pena is being recognized for those accomplishments as well as for long-term technical contributions. Each year, Lockheed selects one outstanding technical person from each of its subsidiaries to receive the award, named after one of the original founders of the Lockheed Corporation, which this year is celebrating its fiftieth anniversary. Lockheed-EMSCO is the largest technical services support contractor at JSC, with about 950 people involved in direct support of NASA programs.

Dr. Noel W. Hinners, Director of the National Air and Space Museum, has been appointed Director of the Goddard Space Flight Center effective June 14. Hinners succeeds **A. Thomas Young**, who left Goddard March 22. Hinners became Director of the Air and

Space Museum in 1979, and before that was Associate Administrator for Space Science with NASA Headquarters from 1974 to 1979. He joined NASA in 1972 as Deputy Director and Chief Scientist for Apollo Lunar Exploration. Hinners currently chairs the NASA Solar System Exploration Committee.

Meanwhile, at the Lewis Research Center, **Andrew J. Stofan** has been named to succeed **Dr. John F. McCarthy, Jr.** as Director. Stofan, the former Acting Associate Administrator for Space Science, has for the last month been serving as advisor to **Dr. Burton I. Edelson**, who became Associate Administrator of the new Office of Space Science and Applications in March. Prior to his assignment to NASA Headquarters in 1978, Stofan was director of launch vehicles at Lewis. He began his career there as a research engineer in 1958, and in 1962 was assigned to the original Centaur Project Office. For the rest of the decade he worked with the B/1-B/2 test programs and the improved Centaur. In 1970, he became Project Manager for the new Titan/Centaur launch vehicle, and directed the proof flight in 1974.

NASA requests detailed tethered satellite plans

Following an initiative taken by Italy in 1980, NASA has asked two Colorado companies for detailed designs of a tethered satellite system, which could troll the heights of Earth's atmosphere suspended from the Space Shuttle on a line as long as 60 miles.

The two-part request for proposals, issued by the Advanced Systems Office at the Marshall Space Flight Center in late March, asks Ball Aerospace Systems Division of Boulder and Martin Marietta Aerospace of Denver for detailed engineering analyses to the point of testing some key components similar to those planned for use in space.

A second part of the request asks Ball and Martin Marietta to specify how they would carry out full-scale development should a new start be approved in Washington. Pending approval for full-scale development, the tethered satellite could be deployed by early 1987.

Both Italy's National Space Plan/National Research Council

(PSN/CNR) and NASA believe the Tethered Satellite System (TSS) would greatly improve on present methods for exploring Earth's upper atmosphere, a region from around 60 to 90 miles high. No airplane is capable of adequately exploring the region, and no satellite can remain in orbit for long at that altitude.

Both Italy's PSN/CNR and NASA have been looking at a tethered satellite concept for some time with an eye to filling that gap in the capability of studying the atmosphere, and gaining magnetospheric and gravitational data as well. Italy proposed cooperation on the project with NASA in 1980. In 1981, a Letter of Agreement was signed delegating the responsibilities of each party in the project: Italy would build the satellite, and NASA would build the deployment system and handle systems integration.

Current plans call for an instrumented sphere 1.2 to 1.4 meters in diameter which could be deployed either toward Earth or space by an Orbiter, according to Jay Laue,

TSS study manager at Marshall. The sphere could perform magnetic field mapping, particulate sampling, plasma interaction studies and various other roles, depending on what instrumentation it carries. Laue said the system is envisioned as a reusable and adaptable facility for long-term Space Shuttle use. The sphere could also be fitted with a reaction control system if necessary. The entire deployment unit would be of the same size as a single Shuttle pallet, he said.

The request for proposal closes May 17. Marshall will then evaluate the proposals and plans to award a contract for the advanced development phase by October, with a firm option for the design and development phase. Both Ball Aerospace and Martin Marietta, as a result of prior competitive procurement, were selected to conduct parallel definition studies of the system, which they recently completed. The detailed design and development competition is therefore limited to Ball and Martin Marietta.

Last of NASA observatories reenters atmosphere

HEAO-2, NASA's second in a series of three High Energy Astronomy Observatories, launched into space in the late 1970s and the last to re-enter, fell from orbit March 25 at 1:27 a.m. CST and burned up harmlessly in the atmosphere, according to the Marshall Space Flight Center.

The entire family of HEAO satellites, designed to study high energy radiation in the universe such as X-rays and cosmic rays, had returned significant data to scientists over a period of several years. All three of the High Energy Astronomy Observatories have been described by NASA officials as "highly successful." HEAO-1, launched in August 1977, scanned the heavens in a general survey and mapped X-ray sources throughout the celestial sphere. The initial survey was completed in Feb. 1978, the design lifetime of the satellite, but it continued to study the skies until its control gas was exhausted in Jan. 1979. During that 17-month survey, HEAO-1 increased the number of known celestial X-ray sources from 350 to 1,500. It discovered a new black hole candidate and indicated the possible existence of a universal hot plasma which would constitute a major fraction of the mass of the universe.

HEAO-1 also discovered a superhot halo of gas, 1,200 light-years in diameter, surrounding the celestial Northern Cross. The halo, or "superbubble," is about 6,000 light-years from Earth in the next spiral arm of our galaxy. Its discovery has formed the basis of a new theory of star formation.

The second high energy observatory, HEAO-2, focused upon specific observation partially guided by the general celestial survey of its predecessor. Nicknamed the "Einstein observatory" by astronomers because its launch date was approximately that of the late scientist's 100th birthday anniversary, HEAO-2 was rocketed into orbit in Nov. 1978. Although the observatory was designed for a mission life of twelve months, it operated for nearly two and a half years.

Carrying the largest X-ray telescope ever built and a variety of sensitive astronomy instruments, HEAO-2 conducted the detailed imaging and spectroscopic observations of approximately 300 known bright X-ray sources and discovered

thousands of new faint X-ray sources. Almost every type of star in the galaxy was shown to have an X-ray-emitting atmosphere. HEAO-2 obtained the first X-ray photographs of supernova remnants, pulsars, star clusters, galactic diffuse X-ray sources, bright sources in other galaxies, and of diffuse emission from clusters of galaxies. Hundreds of active galaxies and quasars were detected, some of which may be the most distant objects ever observed at any wavelength. The Einstein observations have already had a significant impact upon most fields of astronomy.

The final observatory in the HEAO series was launched in Sept. 1979. Unlike its predecessors, which were designed to study X-rays, HEAO-3 furthered knowledge about cosmic-ray particles and gamma-ray photons, the two highest energy radiations in the universe. Through the study of cosmic rays, which are the nuclei of elements and are the highest energy particles known, HEAO-3 measured the relative abundance of elements in the galaxy. The observatory found significant differences between the abundances of certain nuclei in the galaxy and the abundance of these

same elements in the solar system.

Gamma rays, higher on the energy spectrum than X-rays, are emitted from galactic sources which may be unobservable to conventional telescopes. HEAO-3 detectors achieved precise, high-resolution measurements of gamma-ray "line emission" from solar flares and from positive and negative electrons combining near the galactic center. The data sent from HEAO-3 are expected to further the understanding of the strength and extent of interstellar magnetic fields, the distribution of interstellar matter, and—most importantly—the stellar nucleosynthesis process which has created the heavy elements contained in most ordinary matter. According to theory, the "big bang" formed hydrogen and helium and led to star formation. All heavier elements are produced in normal and explosive stellar processes.

Although the HEAO series has already expanded man's knowledge of the universe, scientists say that they will require years to complete their analysis of the massive amount of data returned from the three observatories.

Cookin' in the Cafeteria

Week of April 19 - 23, 1982

Monday: Chicken & Rice Soup; Texas Hots & Beans, BBQ Ham Steak, Steak Parmesan, Beef & Macaroni (Special); Green Beans, Carrots, au Gratin Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Tomato Soup; Potato Baked Chicken, BBQ Spare Ribs, Mexican Dinner (Special); Squash, Ranch Beans, Spanish Rice, Broccoli.

Wednesday: Seafood Gumbo; Baked Turbot, Liver & Onions, BBQ Ham Steak, Baked Meatloaf w/Creole Sauce (Special); Beets, Brussels Sprouts, Green Beans, Whipped Potatoes.

Thursday: Beef & Barley Soup; Chicken & Dumplings, Corned Beef w/Cabbage, Smothered Steak w/Cornbread Dressing (Special); Spinach, Cabbage, Cauliflower au Gratin, Parsley Potatoes.

Friday: Seafood Gumbo; Pork Chop w/Yam Rosette, Creole Baked Cod, Tuna & Salmon Croquette (Special); Brussels Sprouts, Green Beans, Buttered Corn, Whipped Potatoes.

Week of April 26 - 30, 1982

Monday: Cream of Celery Soup; Braised Beef Ribs, Chicken a la King, Enchiladas w/Chili, Italian Cutlet (Special); Navy Beans, Brussels Sprouts, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Beef & Barley Soup; Turkey & Dressing, Country Style Steak, Beef Ravioli, Stuffed Cabbage (Special); Corn Cobbette, Okra & Tomatoes, French Beans.

Wednesday: Seafood Gumbo; Catfish w/Hush Puppies, Roast Pork w/Dressing, Chinese Pepper Steak (Special); Broccoli, Macaroni & Cheese, Stewed Tomatoes.

Thursday: Cream of Tomato Soup; Beef Tacos, BBQ Ham Slice, Hungarian Goulash, Chicken Fried Steak (Special); Spinach, Pinto Beans, Beets.

Friday: Seafood Gumbo; Liver & Onions, Deviled Crabs, Roast Beef w/Dressing, Tuna & Noodle Casserole (Special); Whipped Potatoes, Peas, Cauliflower.

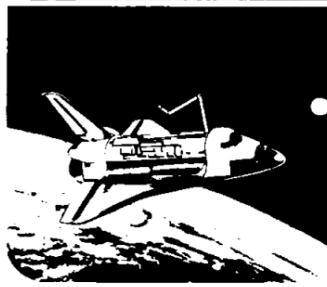
NASA
Lyndon B. Johnson Space Center

Space News Roundup

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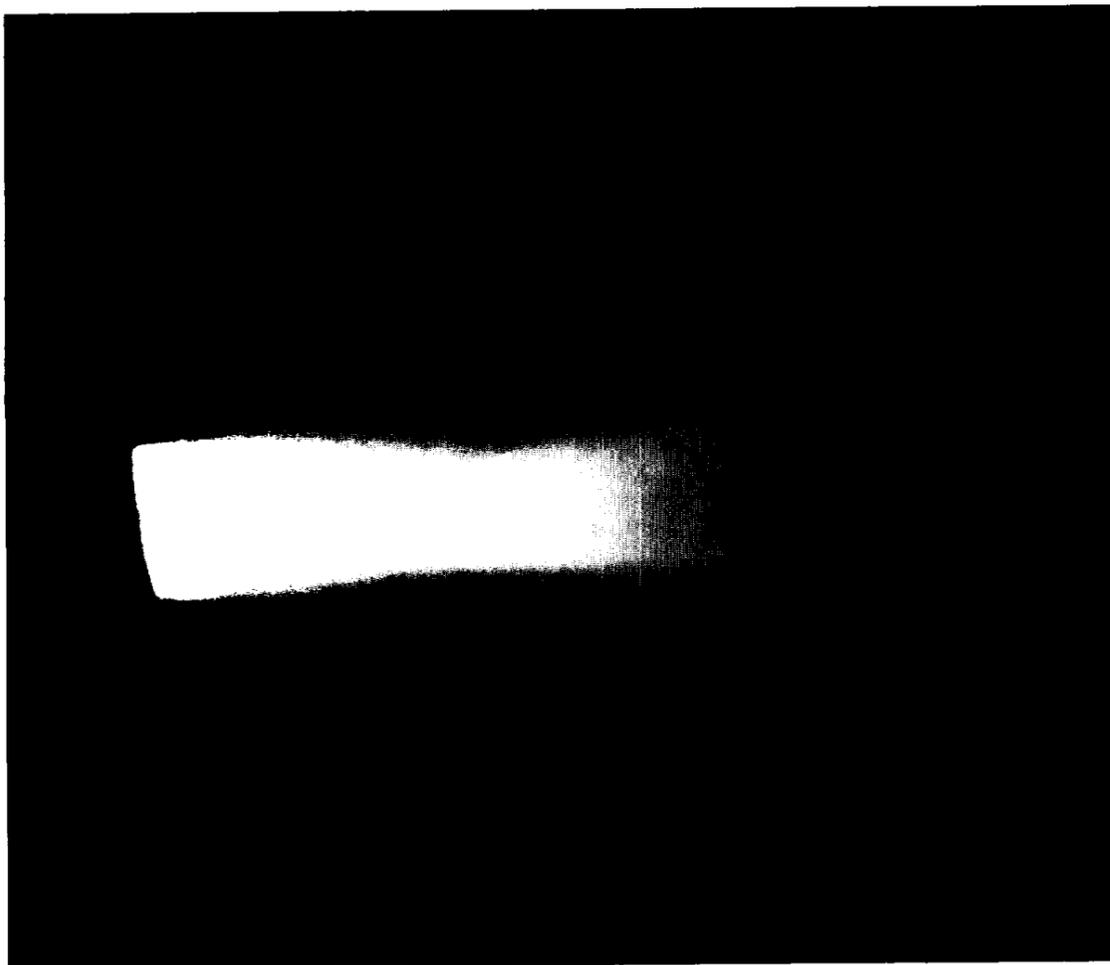
Editor

Brian Welch





A veritable Who's Who of the Shuttle program is pictured here during one of many debriefings for the STS-3 crew. Counter clockwise from lower left are John Young, Astronaut Office Chief and STS-1 Commander; George W. S. Abbey, Director of Flight Operations; Joe Engle, STS-2 Commander; Henry Hartsfield, STS-4 Pilot; Gordon Fullerton, STS-3 Pilot; Jack Lousma, STS-3 Commander; Ken Mattingly, STS-4 Commander; and Richard Truly, STS-2 Pilot. In the photo below, the firing of one of Columbia's forward reaction control system thrusters is visible. This was the first time such a firing had been captured on film. The thruster firing was captured through one of the forward windows of the flight deck during a 100-second firing test.



Bulletin Board

Federal Women's Week observance planned

The fifth annual Federal Women's Week observance at JSC is scheduled for May 11-14 at the Gilruth Rec Center with a variety of presentations. A luncheon at 11:30 a.m. May 11 will kick off the observance, with a keynote speech by Ed Brandon of Channel 13 following at 12:15 p.m. On May 12, Elsa Rosborough will discuss "Directing Your Personal Potential" at 9 a.m. A film, "Tale of O," and a discussion moderated by Jody Close will follow at 11:30 a.m., and the day will be rounded out by a discussion on "Single Parents for the First Time" with Joe Healy and Tim Mercier at 1 p.m. On May 13, a presentation on "Citizens Against Crime" with Roy Felder moderating will be held at 9 a.m.; a film, "Work Place Hustle" and a discussion with Dianne Layden will be held at 11:30 a.m.; and a discussion, "Women's Legal Rights in Texas," with attorneys Wendell Cooper Porter and Roberta Yang will be held at 1 p.m. On May 14, "Office Stereotypes," a discussion with Dr. Tim Singleton, will be held at 9 a.m.; "Family and Career," a discussion with Debra Jackson, Ninfa R. Laurenzo and Martha Wong, will be held at 11:30 a.m., and "Tax Shelters, IRA's, Etc.," with attorney Debra Post and Dr. Mary Elizabeth Schlayer, will be held at 1:30 p.m. Reservations are required only for the opening day luncheon. Tickets go on sale April 21 and may be purchased from the following: Bldg. 1, V. Hughes, x4831; Bldg. 4, C. Blacknall, x5378; Bldg. 8, B. Anderson, x2728; Bldg. 10, J. Davis, x3738; Bldg. 13, C. Lowrimore, x3995; Bldg. 12, J. Birchett, x4653; Bldg. 17, M. Ferguson, x5013; Bldg. 36, M. Ward, x4211; Bldg. 37, J. Williams, x4731; Bldg. 45, E. Gillette, x2135.

March of Dimes Teamwalk participation urged

The Houston Federal Executive Board and the Federal Business Association (FBA) are encouraging federal employees to participate in the 1982 March of Dimes Teamwalks in Houston and Galveston April 25. To encourage participation, the FBA will present certificates to each agency whose employees walk as a team representing their organization. Walks to raise funds for the March of Dimes will be held at Memorial Park in Houston, Strawberry Park in Pasadena, the University of Houston at Clear Lake City and several other locations. JSC employees wishing to participate should call Carl McCollum at the Gilruth Rec Center, x3594, as soon as possible.

AIAA symposium and dinner is Tuesday

The dinner reservation deadline has passed, but interested persons may still attend most of the activities the American Institute of Aeronautics and Astronautics is sponsoring Tuesday. During the day in the Gilruth Rec Center, the seventh Annual Technical Min-Symposium will be held, focusing on "Space Shuttle Development and Flight Results." The symposium will be followed at 6 p.m. by a social, at 7 p.m. by dinner, and at 8 p.m. by a program featuring Joseph G. Gavin Jr., President of Grumman Corp., who will speak on "Planning Priorities and Politics." There is no charge for attending the program only. For more information, call Nancy at x3995.

Hypertension to be discussed at program

Hypertension will be the topic of the health education program scheduled for 10 a.m. April 30 in the Bldg. 30 auditorium. Two films will be shown explaining high blood pressure, the consequences of delaying treatment and what can be done about the problem. A physician will be present to talk about high blood pressure and answer any questions.

Tickets on sale for May 1 EAA picnic

Don't forget the annual JSC-Employee Activities Association picnic—The Best Li'l Picnic in Texas, at Camp Manison May 1. Tickets are available at \$3.50 for adults and \$2.50 for children at the Bldg. 11 Exchange Store from 10 a.m. to 2 p.m. through April 28. The picnic will feature all of the usual attractions—barbeque with all the trimmings, beverages, games and some unusual events like a jalapeno eating contest, armadillo races and palm reader.

TSPE to sponsor engineer registration

The Texas Society of Professional Engineers will sponsor a registration seminar for engineers from 9 a.m. to noon May 8 at the Chemistry Lecture Hall on the campus of Rice University. Woodrow Mize, executive director of the state board of registration for professional engineers, will discuss the Engineering Registration and Practice Act, the functions of the board of registration, and application and filing procedures. For more information, contact Bo Wall at 692-9151, x234.

NASA takes mystery out of mystery cloud

NASA researchers with the help of laser radar data have taken the mystery out of the "mystery cloud" that has covered the Earth's northern hemisphere for the last several weeks.

Ruling out the possibility of an undetected nuclear detonation or a meteor impact, Dr. M. Patrick McCormick of NASA's Langley Research Center said the cloud is actually a layer of particulates that looks identical to data Langley researchers are accustomed to seeing from volcanic eruptions.

The fact that no major eruptions were reported at the time of the cloud's appearance does not dissuade McCormick from his view: "It had to be one that had little local damage but moved material high enough to get into the stratosphere where it can travel around the world. Historically, information on the height of volcanic eruptions has proven unreliable due to, among other things, the difficulty of accurately observing them at night or through cloud cover."

McCormick, head of the Aerosol Measurements Research Branch at Langley, said the eruption probably occurred in late December 1981 or during the first two weeks of January 1982. The results were first observed by the Japanese Jan. 23 and then by another ground-based station in Mauna Loa, Hawaii Jan. 28.

Not until Feb. 13 and 14, when a NASA research airplane flew from Wallops Flight Center on Virginia's Eastern Shore to Costa Rica in Central America, did the evidence begin to overwhelmingly point to a volcanic eruption as the source of the high-altitude pollution.

The altitude and intensity of the cloud, by then a diffused layer, was detected continuously from Wallops, at 38 degrees north latitude, to Costa Rica, at 10 degrees north latitude.

A remote-sensing laser radar, looking upward from the plane, mapped the otherwise invisible layer as being approximately 16 kilometers (10 miles) high at the middle and an average of 3.2 to 4.8 km (2 to 3 mi.) thick.

Comparisons with volcanic emission data taken from 1979 through 1981 by a NASA satellite instrument called SAGE (Stratospheric Aerosol and Gas Experiment) convinced Langley researchers they were seeing the same pattern of particulate distribution. Furthermore, the closest match was with known volcanic eruptions that were about two months old, closely correlating to the suspected beginnings of the present emission.

"... it is equivalent to about one-quarter of a million tons or more of new material in the stratosphere ..."

The airplane instrument recorded peak concentration at about 20 degrees north latitude, close to the latitude of Hawaii. This indicates to McCormick that the emission was probably a low-

latitude eruption, perhaps between the equator and 20 degrees north, as atmospheric travel tends to be away from the equator.

A nuclear or meteoric source for the material is ruled out by McCormick for several reasons: "Our laser radar data show the new aerosol (particulates) are equivalent to about one-quarter of a million tons or more of new material in the stratosphere. A nuclear explosion would not have produced that much mass.

"Also, there have been no reports of radiation increases typical of a nuclear explosion. In the case of a meteorite or meteorites, anything that could produce material of that magnitude would certainly have been noticed."

Langley researchers will continue taking laser radar data, although not as far-ranging as the trip to Costa Rica. That flight was a previously scheduled flight to Mexico and Central America, in cooperation with Drexel University, Philadelphia, and others, to gather local data on active volcanoes in those areas. For-

tunately, researchers were able to gather data on the unexpected new material in the stratosphere during the same trip.

Other members of the atmospheric science community around the world will also continue taking ground-based laser radar and other data on the eruption.

Laboratory analyses are being made of small samples of the particulate material gathered by a high-flying NASA U-2 airplane. The plane is one of two U-2s belonging to NASA's Ames Research Center.

Plans call for an Ames U-2 to be fitted with several instruments for a series of follow-on flights to begin March 23. The payload will include a quartz crystal microbalance from Langley, capable of measuring the size distribution of particles as well as their elemental composition.

Researchers expect the flights to confirm that the particulate plume is a sulfuric acid water mist, normally seen after a volcanic eruption.

Gilruth Center News

Call x3594 for more information

Country western dance - Learn the latest country and western dance steps as well as the old standbys. Next six-week class begins on April 19 from 7:15-8:45 or 8:45-10:15 p.m. Cost is \$20 per couple and class is limited to 15 couples.

Beginning oil painting - Learn the relaxing art of oil paints. This class is strictly for the beginner and meets on Tuesday from 7-9 p.m. Class is limited to 10 students

Softball tournament - The 7th Annual Spring Tournament of Champions Tourney is now taking registration in both men and women's teams. The tournament will be held at the Rec Center on April 16, 17 and 18. Entry fee is \$65 per team. For more information call x3594.

Children's movie - The next children's movie will be "Swiss Family Robinson". It will be shown on April 24 from 10 a.m. — noon. Cost is \$1 per person and includes popcorn and cokes. Tickets are on sale at Bldg. 11 Exchange Store.

Garage sale - Limited number of tables exist for the garage sale on April 17 from 9 a.m. - 3 p.m. Make reservations in person at the Recreation Center. Cost is \$2 a table.

Steak and roast sale - To encourage greater use of our catering service, the Gilruth Recreation Center is able to offer for a short time 20% off all prime rib, roast and steak entrees. The Assembly Hall at the recreation facility is available for luncheons, dinners and receptions, catering to retirements, professional organization meetings, official functions and dinner dances. The menu is varied with a large selection of entrees to choose from. Call x4921 for more information.

Almost anything goes contest - Teams may now enter this contest which requires no previous competitive experience. Contest consists of 4 fun-type events, the rules of which are known only to the Rec Center staff. Teams consist of 4 males and 4 females. Cost is \$10 per team and T-shirts and trophies go to the winners. Dates for the competition will be predicated on the number of entries. Finals will be at the JSC Picnic on May 1. Call x3594 for more information. Deadline for entries is April 20.

Tug-o-war - Round up your 8 strongest men and women, 4 of each, and get ready to participate in the tug-o-war. Cost is \$5 per team. Trophies to the winners. Deadline for entries is April 29.

Armadillo races - This event will be held at the JSC Picnic on May 1. Entry will be drawn from your ticket stubs.

Intercenter race - You still have time to represent JSC in our Intercenter Run. Events include 10 km and 2 mile run held at the Recreation Center starting April 5 thru 24th at 5:15 p.m. and Saturday April 17 at 9 a.m. Ribbons go to all finishers and medals to the top three in each category—local and NASA-wide. Refreshments will be provided. For more information call x3594.

Adult beginning tennis - Designed for the person who has never had tennis lessons. This class meets on Tuesdays from 5:15-6:45 p.m. for 8 weeks. Class begins on April 22 and cost is \$24 per person. Space is limited.

Adult intermediate tennis - Designed to refine a particular aspect of your game. Class on Tuesdays from 5:15-6:45 p.m. Cost is \$20.

Tests underway on failed EEVT sample freezer

Scientists and astronauts were sounding a more upbeat note this week in the wake of a ground freezer failure which caused the loss of cell samples from the STS-3 Electrophoresis Equipment Verification Test (EEVT).

"We were disappointed that the samples were lost," said STS-3 Pilot Gordon Fullerton, "but for the first time, we got the equipment to actually work, better than in training or on any previous flights."

As a quality assurance team and an investigative panel were conducting tests on the failed cryogenic freezer to determine exactly why it allowed the samples to thaw sometime during the weekend of April 3-4, scientists from JSC and the Marshall Space Flight Center were reviewing the data they did get, and the preliminary outlook was positive.

"This was, after all, an equipment verification test," said Dr. Stuart Nachtwey, Chief of the Biomedical Applications Branch, "and we do have data to show the equipment did work. We are able to electrophorese in space—now we have firm proof of that. Of course, we had hoped also to demonstrate the value of electrophoresis by making use of those separated cells on the ground. In that sense, we got the

cake but not the icing."

Dr. Robert Snyder, the Principal Investigator from Marshall for EEVT, said preliminary indications are there was not the exact type of red blood cell separations scientists had been expecting, "but indeed there was some separation, and it was a successful test in that the apparatus did work."

The failed freezer, nearly identical to the one aboard *Columbia*, was the subject of investigations during the week as it was charged and sealed again in an effort to understand why it allowed the samples to thaw.

Six batches of human embryonic kidney cells and two batches of red blood cells were aboard for the experiment. It was essential to post-mission science that they be kept frozen in a separated state, but on April 5 the samples were found thawed and pooled at the bottom of the cryogenic freezer.

The freezer, used for transport of the cells from the landing site at White Sands to JSC, is a stainless steel double-walled cylinder lined with an insulation which collects and holds liquid nitrogen, the freezing agent. The eight batches of cell samples were removed from *Columbia* within two hours of landing March 30 and transferred

to the freezer for the trip back to JSC aboard a Shuttle Training Aircraft that afternoon.

"Of all the things which could have gone wrong," Nachtwey said, "the freezer is the last piece of equipment we would have expected to have trouble with."

Electrophoresis is a process which uses an electric field to separate cells and other biological materials in fluids without damaging the cells themselves. These cells can then be used in the study of cellular biology, immunology and basic medical research. The process is limited on Earth, however, because heat produced by the electric field causes convection currents and a re-mixing of the cells with the fluid, thereby defeating the separation process. In space, these convection currents do not occur, and electrophoresis has been seen as having a much greater potential there than on Earth.

Another type of electrophoresis device will fly on STS-4 and subsequent missions. Called the Continuous Flow Electrophoresis System, the device is part of a joint endeavor between NASA, McDonnell Douglas and the Ortho Pharmaceutical Corp.

Adventure

(Continued from page 1)

But as on-orbit footage continued, showing the two as they maneuvered about the spacecraft, zipping headfirst down the passages between flight deck and mid deck for instance, it became apparent that they settled into

their new conditions reasonably well by the second day in orbit.

One segment showed Fullerton literally bouncing off the walls of the mid deck headfirst, much to the delight of the audience, while other segments showed the two

exercising, eating, cleaning up and performing their flight plan duties.

In summing up, Fullerton said, "It was definitely more of a kick than even I thought it would be. I'm sure going to get back in line for another shot."

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Property and Rentals

For rent: Galveston By-The-Sea Condominium, two BR furnished apartment for rent by day, week, or month. Call Clements, 474-2622.

For sale: League City, Pecan Forest, 3-1-3/4-2, spacious, fireplace, assume 8.5% loan or new low interest financing, \$70's. Call 554-6200 or 212 Pecan Dr.

For rent: League City, 3-1-1/2-2, fenced, near schools, immaculate, available May, no pets, \$495/month. Call 554-6200 or 212 Pecan Dr.

For rent: To conscientious, non-smoking male, one furnished BR in a 3 BR house in League City, kitchen, W/D, garage privilege. Call 538-2184, evenings.

For sale: 2 BR Bryan townhouse, all appliances, 3 miles from Texas A & M, available June 1. Call Jim, x4196 or 726-0653.

For rent: Galveston Jamaica Beach, central AC, furnished 3 BR, boat mooring, by weekend or week. Call Darrell Smith, 337-3970, after 6 p.m.

For sale: Investors 3-2-2 League City, Newport, \$11,000 down, \$597/mo., owner financing, leased. Call 482-3011.

For rent: Galveston West Beach 2 BR, AC, gulf side, \$150/week. Call 481-5943.

For rent: Galveston West Beach, 3 BR, AC, Gulf side, \$250/week. Call 481-5943.

For rent: 1 BR Hawaii condo, waterfront, Makaha area of Oahu, \$175/week. Call 481-5943.

For sale: Heritage Park, 3-2-2, extra large lot in cul-de-sac, fenced, microwave, fireplace, assumable 12.5% FHA, \$13,000 down. Call John, x5301 or 482-8457.

Cars and Trucks

1976 Oldsmobile Cutlass Supreme Broughm, super clean, excellent mechanical condition. Call Holland, 334-2461.

1973 Vega, under 50 K miles, runs well, \$500. Call 482-1702.

1981 Chevy Citation, V-6, PS, PB, AM-FM Stereo, AC, cruise, 15K miles, excellent condition, \$6,595 firm. Call 332-2291.

1980 Eldorado, excellent condition, computer, moon roof, AM/FM/8 track stereo, locking wire wheels. Call Linda, x2969.

1978 Oldsmobile 98, loaded with extras, one owner, very good condition, make offer. Call Charles, 332-1412 or 332-4242 after 7 p.m.

1975 4-door Ford, very good condition, extra clean interior, power, air, set of new tires and new battery, asking \$1,400. Call x2031 or 471-3165 after 5:30 p.m.

1972 Dodge Charger, V-8, PS, PB, auto, AC, AM/8 track, \$1,000. Call Don Prevett, x5495 or 480-1650.

1973 Buick, 2 door, no air, \$1,200. Call Betty, x3328.

1979 Chevrolet Silverado, fully loaded, all power options, extras, \$5,500. Call Pace, x5321 or 488-3211 (days), 534-7340 (evenings).

1974 Volvo 164E, auto, air, PS/PB, AM/FM/cassette, excellent condition, \$3,000. Call 480-7422 after 5 p.m.

1978 GMC VanDura Van, Midas Custom package, fully loaded, low mileage. Call 488-4453.

1976 Chev Luv pickup, A-1 mech. and body, AC, auto. trans., good mileage. Call 482-7698 or x2761.

1978 Toyota Corolla SR5 Liftback, AM/FM, power brakes, rear window defroster, 38 K miles exc. condition, \$3,750. Call 471-2447.

Cycles

Ladies 3-speed Schwinn bike, old but solid, \$25. 482-6027.

1980 Honda CX-500 Custom, mag wheels, XLNT, 6,300 mi, \$1,800. 488-5734.

1981 minibike, Sears Deluxe 4 hp, run less than 40 hours, exc. condition, \$225 or best offer. Kimball, x6316 or 471-5736.

1980 Honda 400 MCT, burgundy color, 3,500 miles, excellent condition, best offer. Call 488-0867 after 4 p.m.

1976 Honda 750 Super Sport, 6100 miles, garaged, helmet, U-bolt lock, \$1,195. x5301 or 482-8457.

1981 CR125RB Honda, \$900; RM125X Suzuki, \$900; YZ100 Yamaha, \$700; 1980 YZ100 Yamaha, \$600; conditions excellent. Call 339-2294 after 6 p.m.

Schwinn 24 inch, 10-speed bicycle, 2 yrs old, excellent condition, \$90. Tom Mancuso, x5473 or 534-4262.

Boats & Planes

1980 Sea Ray, Mod. 192SRV, 165 hp i/o, extras, low hrs, exc cond,

\$8,200. Call Ray Wilson, x2766 or 488-6266 after 5 p.m.

1976 Cessna 150 for rent, transponder, ADF, 0 time SMOH, Long Range Trans, Based at Houston Gulf, \$25/hr. wet, 946-1750 for information and reservations.

BD-5 Experimental airplane, 70% complete, exc. workmanship, \$2,000. Call 488-6433 after 5 p.m.

For rent: 1975 Piper Warrior, Houston Gulf, \$33/hr wet. Call 946-1750.

1975 Bass Boat, 17', 85 Evenrude, 13" wheel tilt trailer, depth finder, troll motor \$3,500. Tom White, X7484 or 485-2924 after 5 p.m.

Catamaran, 16' G-Cat, fwd trampoline, trapeze, near new condition, fastest cat under 18', trailer, \$2,900. Call Don, 488-3819 evenings.

1974 Trihull 17', i/o 165 hp, many extras, trailer, licensed for commercial bay shrimp, complete shrimp rig. Excellent condition. Make offer. Schnell 337-2402/488-9005.

Wanted

Van-camper or custom for 10 day vacation (6/4-6/14), family of 4. Call Sue, 339-1926 after 6 pm.

Garage apt. in Kemah area, mother and child are tidy and quiet. Call Debi, x4221.

Rooms, apartments, houses to sublease, lease or rent during the summer months for Johnson Space Center Summer Faculty Program visitors. Call Barbara at x2838.

Wanted to buy Kodak Carousel slide projector, preferably with autofocus & zoom. Call 480-4757 eve.

Need a back up driver riding to and from Baytown, hours from 8 a.m. to 4:30 p.m., Monday-Friday. Please call Marschel Floyd, x2855.

Need rider: Quail Valley (Mo. City.) to NASA, 7:30 to 4 p.m. Call Bob Patil at 488-9005 (office).

Wanted: Used aviator's headset and megaphone unit, preferably with push-to-talk switch. Mark, x4436 or 480-2634.

Musical

LeBlanc clarinet, excellent quality, \$250. Call 334-1127 after 5 p.m.

Like new, Hohner 5-string banjo with hardshell case, paid \$550, asking \$300 firm. Call 482-8172.

Video and Audio

Children's record players, stereo \$15, Mono \$8, Good condition. Call 482-6027.

RCS color console, 25", needs some work, \$75. Call 471-2447.

Household

Light green 5' x 8' oval braided area rug, reversible, one side never used, \$50. Two brass lamps, \$15 each. Call 488-3433.

GE refrigerator, frost free, 11 cu. ft., bottom freezer, olive green, 18 yrs. old, excellent condition, \$90. Call 474-5258 after 5 p.m.

Sears washer, 1971 model, recently repaired, \$25. Call Mancuso, x5473 or 534-4262.

Double size mattress less than 6 months old, in good condition, \$50. Call x2031 or 471-3165 after 5:30 p.m.

Freezer, 21 cu. ft., excellent condition, \$450. Call 481-4372 after 5:30 p.m.

Girl's white provincial twin canopy bed, mattresses included, dresser w/mirror and vanity, \$225. Call 488-5471 after 3 p.m.

Two Spanish style bar stools, \$70 for both. Call 941-7994.

Old large sofa; 10' x 12' red carpet, come pick them up. Call John, x5301.

Two living room chairs, blue, \$50; one couch, red and blue check, \$50; one picture window, frame, glass and woven shade, \$45; one swimming pool leaf catcher and sweeper, \$20. Call 488-1326 after 5 p.m.

Pets

For sale: AKC registered Sheltie puppies, males and females, sable and white. Call Boykin, 334-1267 after 5 p.m.

Silver toy Poodle, looking for female AKC registered for breeding and pick of litter. Call 333-2717 evenings.

One 15 gallon aquarium and one 20 gallon with everything included, one with fish as well, \$50 each, stands included. Call x2031 or 471-3165 after 5:30 p.m.

For sale: four Sheltie puppies, six weeks old. Call Jeanette, x3725.

Free: mixed breed dogs to a good home, all shots, both spayed, both 1 year old. One part collie, friendly, one

part Labrador, good watchdog. Call Amanda, 486-9605 or 944-2492, evenings.

Photography

Black body Nikon F, PTN head accessories, 75-150 mm 4.5, auto zoom, 135 mm 2.8, 35 mm 2.5, and 55 mm 1.2 lens—all in like-new condition. Sell together for \$650 or make serious offer. Call Dean, x2569 or 333-3426 after 6 p.m.

Little-used Omega 45E view camera with 150 mm Rodenstock "Sironar" lens, convertible to 300 mm six double film holders, drop cloth, fitted hardshell carry case and slightly worn Yashicamat 120 rollfilm camera. All for \$400. Call 482-8172.

Lost

Man's brown glove, lost 26 March in vicinity of Bldg. 3 or 4. Call Jim, x2868.

Miscellaneous

Fly Pan Am International coupon till May 31, \$50. Call D. Wood, x4465 or 333-2373 evenings.

SCUBA equipment, tanks, reg., suit, light, knife, autofill BC, weights, etc., \$1,500 invested. Call Erni, 332-9035.

Men's/boy's black leather roller skates, size 10, \$30. Call 482-6027.

Wilson 1200 golfclubs, four registered woods, nine irons, bag and cart, perfect condition. Call 479-7243.

Sears natural gas BBQ grill w/manual, \$65. Call 474-3507.

Electronic pong set, tennis, hockey and target, \$15. Call A. F. Smith, x4468.

2-4-1 Pam Am passes outside U.S., use before May 31, round trip on coach or clipper, \$100. Call Elaine, 483-3803 or 334-2402.

Never used wedding gown and veil, size 5-7, paid \$450 and will sell for \$225. Call x2031 or 471-3165 after 5:30 p.m.

Nylon tent, 9' x 12', used once, \$60. Also, Kodak instant print camera in the case, never used, \$25. Call 481-4372 after 5:30 p.m.

Camper shell for small pickup, long bed, interior paneling, jalousie windows, wired for AC/DC, excellent condition, \$250. Call Dave Moore, x2886 or 485-1705.

Antique 7' mahogany gun cabinet, holds 12 guns. Glass doors plus two deep and one flat drawer. Call 334-1127 after 5 p.m.